

# PATENT ABSTRACTS OF JAPAN

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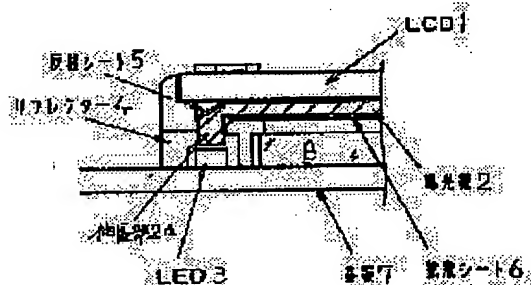
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## (54) BACK LIGHT SYSTEM OF LCD

### (57)Abstract:

**PROBLEM TO BE SOLVED:** To ensure efficient incident of the light of an LED on a light guiding plate which illuminates an LCD from the rear surface side by providing a back light system with an extension part which extends the rear surface of the light guiding plate above a light emitting element rear the light emitting element.

**SOLUTION:** The extension part 2a, where the rear surface facing the LED 3 is extended downward so as to face the LED 3 near the light emitting part thereof, is formed at the end of the light transmission plate 2. The light of the LED 3 is efficiently made incident on the rear surface of the extension part 2a by such constitution, is introduced upward in this state and is again made incident in the inward direction of the light guiding plate 2 by a reflection sheet 5. The LCD 1 is illuminated the light from its rear surface while the light is reflected and diffused by a diffusion sheet 6. The extension part 2a, where the rear surface above the LED 3 is extended near to the LED 3, is formed at the light transmission plate 2 in such a manner and, therefore, the light of the LED 3 is effectively introduced upward from the rear surface of the extension part 2a near the same and the effective illumination of the LCD 1 is made possible.



## LEGAL STATUS

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**CLAIMS**

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[Claim(s)]

[Claim 1] LCD and the light guide plate which is arranged at abbreviation parallel at the tooth-back side, and illuminates this LCD, In the back light method of LCD which an optical-path conversion means to reflect the light of the light emitting device arranged at the edge subordinate side of said light guide plate and the light emitting device which carries out ON light from the inferior surface of tongue of said light guide plate in the direction of the interior possesses Said light guide plate is a back light method of LCD with which the inferior surface of tongue of the light emitting device upper part is characterized by forming the expanding section expanded to near the light emitting device.

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**DETAILED DESCRIPTION**

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**[Detailed Description of the Invention]**

**[0001]**

**[Field of the Invention]** This invention relates to the back light method of LCD (liquid crystal display component).

**[0002]**

**[Description of the Prior Art]** The back light method of the conventional LCD is shown in drawing 2 . As for LCD, the diffusion sheet with which a reflector and 5 carry out a reflective sheet and, as for 6, LED (light emitting device) and 4 carry out [ 2 / 3 / a light guide plate and ] reflective diffusion of the light, and 7, in drawing 2 , 1 is [ the circuit board and 8 ] circuit units, such as a LCD drive circuit. On the circuit board 7, LCD1, a light guide plate 2, LED3, the reflector 4, the reflective sheet 5, the diffusion sheet 6, and the circuit unit 8 are attached. A light guide plate 2 is stuck to abbreviation parallel, and is attached in the tooth-back side of LCD1. The diffusion sheet 6 is stuck on the tooth back of a light guide plate 2. Moreover, in the edge of a light guide plate 2, LED3, a reflector 4, and the reflective sheet 5 are arranged, and light of LED3 is carried out for carrying out ON light into a light guide plate 2. In the example of drawing 2 , the edge of a light guide plate 2 is cut aslant, the reflective sheet 5 is formed in a cut side, it reflects with the reflective sheet 5 of a cut side, and ON light of the light which carries out ON light from a light guide plate 2 edge subordinate side is again carried out into a light guide plate 2. While reflective diffusion is carried out with the diffusion sheet 6, the light which carried out ON light in the diffusion sheet 6 direction among the light reflected with the reflective sheet 5 spreads round the light guide plate 2 whole uniformly, and illuminates LCD1 from a tooth back. Once carrying out ON light, it is reflected with a reflector 4 and a part carries out ON light of the light by which end-face reflection was first carried out in respect of the edge subordinate of a light guide plate 2 among the light of LED3, or the light which it was reflected by the reflective sheet 5 and has carried out outgoing radiation from a light guide plate 2 edge subordinate side into a light guide plate 2 again.

**[0003]**

**[Problem(s) to be Solved by the Invention]** However, with the conventional technique, since LED3 is attached direct picking on the circuit board 7, distance is between LED3 and a light guide plate 2, and ON light of the light was not able to be effectively carried out to a light guide plate 2.

**[0004]**

**[Means for Solving the Problem]** In order to solve the technical problem of the above-mentioned conventional technique, let this invention be the expanding section which elongates the light guide plate inferior surface of tongue of the light emitting device upper part to near the light emitting device.

**[0005]**

**[Embodiment of the Invention]** Drawing 1 shows 1 operation gestalt of this invention, gives the same sign to the same part as drawing 2 of the conventional example, and omits explanation about the same part. As shown in drawing 1 , it is referred to as expanding section 2a caudad elongated so that the inferior surface of tongue which counters LED3 might counter near the light-emitting part of LED3 in the edge of a light guide plate 2. ON light of the light of LED3 is effectively carried out on the inferior surface of tongue of expanding section 2a by this configuration, and it is led up as it is, and while ON

light is again carried out in the direction of the interior of light guide plate 2 and reflective diffusion is carried out with the diffusion sheet 6 with the reflective sheet 5, LCD1 is illuminated from a tooth back.

[0006]

[Effect of the Invention] The light guide plate which this invention is arranged with LCD at abbreviation parallel at the tooth-back side, and illuminates this LCD as explained above, In the back light method of LCD which an optical-path conversion means to reflect the light of the light emitting device arranged at the edge subordinate side of said light guide plate and the light emitting device which carries out ON. light from the inferior surface of tongue of said light guide plate in the direction of the interior possesses Since said light guide plate is having the expanding section which the inferior surface of tongue of the light emitting device upper part expanded to near the light emitting device formed, the light of a light emitting device becomes possible [ it being effectively led up from a nearby expanding section inferior surface of tongue, and illuminating LCD efficiently ].

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**DESCRIPTION OF DRAWINGS**

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[Brief Description of the Drawings]

[Drawing 1] Drawing showing 1 operation gestalt of this invention

[Drawing 2] Drawing showing the conventional example

[Description of Notations]

1: LCD (liquid crystal display component) 2: Light guide plate 2a: The expanding section of a light guide plate

3: LED (light emitting device) 4: Reflector 5: Reflective sheet

6: Diffusion sheet 7: Circuit board 8: Circuit unit

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[Translation done.]

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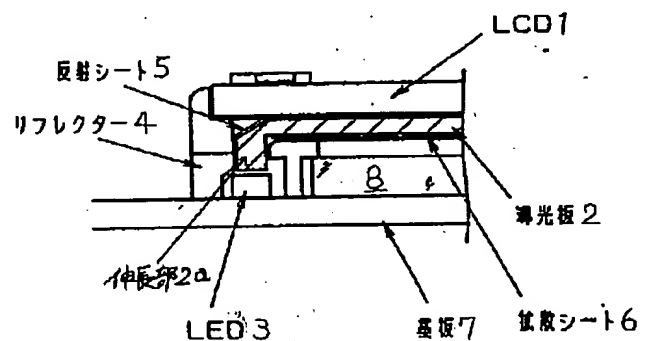
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(54)【発明の名称】 LCDのバックライト方式

(57)【要約】

【課題】 LCDを背面側から照明する導光板へLEDの光を効果的に入光させることを課題とする。

【解決手段】 LCDと、その背面側に略平行に配置され該LCDを照明する導光板と、前記導光板の端部下側に配置される発光素子と、前記導光板の下面側から入光する発光素子の光を導光板内部方向に反射する光路変換手段とが具備されるLCDのバックライト方式において、前記導光板は発光素子上方の下面を発光素子近傍まで伸長させた伸長部を形成してある。



(2)

## 【特許請求の範囲】

【請求項1】LCDと、その背面側に略平行に配置され該LCDを照明する導光板と、前記導光板の端部下側に配置された発光素子と、前記導光板の下面から入光する発光素子の光を内部方向に反射する光路変換手段とが具備されるLCDのバックライト方式において、前記導光板は発光素子上方の下面が発光素子近傍まで伸長させた伸長部を形成されていることを特徴とするLCDのバックライト方式。

## 【発明の詳細な説明】

## 【0001】

【発明の属する技術分野】本発明は、LCD（液晶表示素子）のバックライト方式に関する。

## 【0002】

【従来の技術】従来のLCDのバックライト方式を図2に示す。図2において1はLCD、2は導光板、3はLED（発光素子）、4はリフレクター、5は反射シート、6は光を反射拡散させる拡散シート、7は回路基板、8はLCD駆動回路等の回路ユニットである。回路基板7上にはLCD1、導光板2、LED3、リフレクター4、反射シート5、拡散シート6、回路ユニット8が取り付けられている。LCD1の背面側に導光板2は略平行に密着して取り付けられる。導光板2の背面には拡散シート6が貼られている。また導光板2の端部にはLED3、リフレクター4、反射シート5が配置され、LED3の光を導光板2内に入光させようとしている。図2の例では、導光板2の端部を斜めにカットしカット面に反射シート5を設け、導光板2端部下面から入光する光はカット面の反射シート5で反射し再び導光板2内に入光される。反射シート5で反射した光のうち拡散シート6方向に入光した光は拡散シート6で反射拡散されながら導光板2全体に万遍なく行き渡りLCD1を背面から照明する。LED3の光のうち、はじめに導光板2の端部下面で端面反射された光や一旦入光しながら反射シート5に反射され導光板2端部下面から出射してしまった光はリフレクター4で反射され再び導光板2内に一部が入光する。

## 【0003】

【発明が解決しようとする課題】しかしながら、従来技

術では回路基板7上にLED3を直接取り付けられているためLED3と導光板2との間に距離があり、導光板2へ効果的に光を入光させることができなかった。

## 【0004】

【課題を解決するための手段】上記従来技術の課題を解決するために本発明は、発光素子上方の導光板下面を発光素子近傍まで伸長する伸長部とする。

## 【0005】

【発明の実施の形態】図1は本発明の一実施形態を示し、従来例の図2と同一部位には同一符号を付しその同一部位については説明を省略する。図1に示すように導光板2の端部にはLED3に対向する下面が発光素子の発光部近傍にて対向するように下方に伸長された伸長部2aとされている。この構成によりLED3の光は伸長部2aの下面に効果的に入光し、そのまま上方に導かれ反射シート5によって導光板2内部方向に再び入光され、拡散シート6で反射拡散されながらLCD1を背面から照明する。

## 【0006】

【発明の効果】以上説明したように本発明は、LCDと、その背面側に略平行に配置され該LCDを照明する導光板と、前記導光板の端部下側に配置された発光素子と、前記導光板の下面から入光する発光素子の光を内部方向に反射する光路変換手段とが具備されるLCDのバックライト方式において、前記導光板は発光素子上方の下面が発光素子近傍まで伸長させた伸長部を形成されているので、発光素子の光は近傍の伸長部下面から効果的に上方に導かれ効率的にLCDを照明することが可能となる。

## 【図面の簡単な説明】

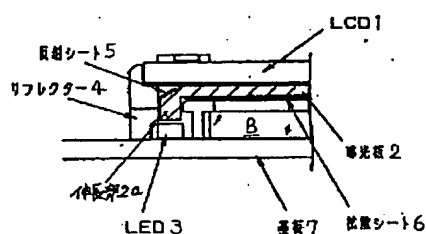
【図1】本発明の一実施形態を示す図

【図2】従来例を示す図

## 【符号の説明】

1：LCD（液晶表示素子）      2：導光板      2  
a：導光板の伸長部  
3：LED（発光素子）      4：リフレクター  
5：反射シート  
6：拡散シート      7：回路基板      8：回路ユニット

【図1】



【図2】

